

Atty. Docket No. 2001-0093-01
USSN 09/896,689Remarks

Claims 1-64 are pending in the above captioned application. Claims 1-25, 29-34, 36-38, 45-51, 53-57 and 59-64 have been allowed. Claims 26-28,¹ 35, 39-44, 52 and 58 stand rejected. The claims have been amended to correct typographical errors and to conform the claim language in certain claims to language previously required by the Examiner in claim 22 for formal reasons, and to remove an amendment erroneously made to claim 36 previously and to conform the language in that claim to other claims in the above captioned application. These amendments have not been made to define over any prior art and have not been made with the intent to narrow the claim and do not have the effect of narrowing the claims, but actually broaden the claims to cover what was not covered before or could not be covered before since the claim was indefinite or had other formal objections to its language.

While not objecting to the claims and listing them as allowed, the Examiner has indicated that claims 1, 22, 25, 29, 33-34, 36 and 42 "are confusingly written." Reference is made to, e.g., FIG. 1 and text describing that FIG. and the invention in general according to aspects of an exemplary embodiment of the present invention that should clarify these points. (See, in addition to FIG. 1, p.8, lines 9-24, 10, lines 4-6, p. 12, lines 14-18, p. 14, line 28 - p. 15, line 25).

For example, the Examiner has noted that the claims:
recite that data is measured during an 'abnormal period' and that the data is indicative of the behavior of the machine when in 'normal use.' These features appear to contradict one another since if an abnormal period (off-line) initiates the data gathering, then the machine is *not* actually operating during normal operation, as the claims would suggest. The examiner has interpreted these features to essentially disclose that the data measuring occurs *during* an abnormal period, and that this abnormal period *occurred* during the normal operation of the machine, in other words, the start of the abnormal period is equivalent to the end of the normal operations for the machine (i.e., abnormal period = end to normal operations. (Emphasis in original))

¹ The Office Action cover sheet only lists claim 28, but the body of the Office Action contains rejections of claims 26-28.

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The Examiner's interpretation is essentially correct in that claimed "abnormal period triggered by an event" is not normal operations, at least in the sense that according to aspects of an exemplary embodiment of the present invention:

a motion control system responds to some event, such as an operator command or automated detection of degraded performance by shifting the system into data acquisition mode. ... In this mode, transfer function data is collected by injecting signals into all relevant actuators and taking measurements from all sensors of interest. (p.8, lines 8-15)

As can be seen from FIG.'s 1 and 2, responsive to such an event the system in block 52 switches to data acquisition mode and, by way of example, the switch 10 removes the output of the controller 12 from the loop and inserts a signal generator 15, which inserts the "signals to [the] actuators." The controller according to one exemplary embodiment, or a separate processor, then can measure the responses in the sensors to the signal applied to the actuators by the signal generator against expected responses according to an existing model (e.g., as shown in equation at p. 10, line 8) and then uses measured errors from the expected responses to create a new controller model. Thus, the start of "abnormal operations" of the claimed "system for controlling the physical behavior of an apparatus," and like recitations is the "end of normal operations" of the "system" since in the exemplary embodiment the signal generator and not the normal controller is providing control signals to the actuators.

Claims 54 and 57 have been objected to as indefinite;

because they refer first to a mathematical filter, then refer to this filter as simply a filter, then refer to the filter as a universal filter. The examiner has therefore interpreted the mathematical filter to be the equivalent of the universal filter.

Claims 54 and 57 have been amended to refer to the filter consistently as the universal filter for purposes of maintaining correct antecedent basis and to avoid possible confusion that separate mathematical and universal filters are intended. While the universal filter is a mathematical filter, two different filters were not intended to be recited and consistent with other claims in the case a single universal filter is now recited in claims 54 and 57. These amendments have not been made to define over any prior art and have not been made with the intent to narrow the claim and do not have the effect of

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narrowing the claims, but actually broaden the claims to cover what was not covered before or could not be covered before since the claim was indefinite or had other formal objections to its language.

The Specification has been objected to since:

'abnormal period' which appears throughout most of the claims appears only in the claims. The Specification, [0012], refers to 'abnormal use' when it is 'off-line' and this is how the examiner has interpreted 'abnormal period', that is, when the apparatus (e.g., machine) is in an off-line state.

The portion of the specification to which the Examiner refers (p. 4, line 30) is actually referring to the prior art, where the machine being controlled, *as opposed to the control system controlling the machine*, is taken off-line, i.e., shut down (in "abnormal use" as defined in the prior art) to do control system tuning. The claimed "abnormal period" refers to the condition of the claimed control system in the data acquisition mode, as discussed above, as an abnormal period in the sense that the control system is not in use while the machine being controlled may and usually is in actual use. That is, as explained in the above noted portions of the Specification, in the exemplary embodiment there described, the control outputs from the controller are not in the loop and the signals from the signal generator are being used to generate responses in the actuators on the machine being controlled, the responses to which are being sensed by the respective sensors and the controller or other processor compares them to the expected response based on the existing model to measure error(s) against the expected response from the existing model to tune the model to create a new model.

As discussed in the portions of the Specification above noted, the disclosed and claimed "system for controlling," is operated on the one hand in a "normal mode" in which in the embodiment illustrated "switch 10 selects an output of the controller 21 ... as an input to the plant 20" (p. 14, lines 29-30). This is juxtaposed to a "tuning mode" (p. 15, line 2) and/or a "data acquisition mode," (p. 15, line 10) where the output of the controller 21 is not the input to the plant. Thus a "normal" period equated to a period when the control system is in the "normal mode" as defined and an "abnormal period" is a period of time when the control system is not in the "normal mode," as defined.

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The Examiner has also referred to the fact that the term "universal filter" appears only in the claims. However, the Specification notes (p. 13, lines 25-28):

the filter, *f*, completely describes a mapping from an identified model to a controller. The filter *F*, is thus *universally* applicable, obviating the need for programming a new filter for each configuration of equipment, thus saving time, money, processing power, and computer programmer time.

Applicant submits that this disclosure, at least, fully supports the recitation "universal filter" in the claims.

The Examiner has also noted that the term "portable" in claim 9 only appears in the claims. The Specification has been amended to support the "portable" recitation, without adding new matter, since claim 9 formed part of the specification as originally filed.

The Examiner has also noted that the terms "passage of a predetermined length of time" and "threshold" in claim 11 appear only in the claims. Applicants submit that the Specification as filed (p. 15, lines 14-16 support the recitations to which the Examiner refers, i.e., "command generated as a result of a clock ..." clearly implies to one skilled in the art that the command is generated after the passage of some selected or "predetermined length of time," and that "change in performance of the system," in the context of the disclosed exemplary control system would be measured against some selected or predetermined "threshold value." Nevertheless, the Specification has been amended at the noted location to more specifically support the noted claim recitations, without adding new matter, since the recitations in claim 11 formed part of the Specification as originally filed.

The Examiner has noted that the term "proximity" appears only in claims 1, 18, 32, 45 and 49 and not in the Specification. These claims have been amended to recite that the claimed sensor element is on the apparatus and in the case of claims 18, 32, 45 and 49 senses data regarding a machine component of the apparatus, to conform to claim 1 and the support in the Specification, e.g., at p. 9, lines 23-26. These amendments have not been made to define over any prior art and have not been made with the intent to narrow the claims and do not have the effect of narrowing the claims, but actually broaden the claims to cover what was not covered before, i.e., "on" as opposed to "in

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proximity" or could not be covered before since the claim was indefinite or had other formal objections to its language, including lack of support in the Specification.

The Examiner has noted that the terms "multivariate" and "fully-coupled" appear only in claims 18, 22 and 46-52 and not in the Specification. Claim 18 has been amended to correct a typographical error, to change "multivariate" to "multivariable," to conform the claim to the disclosure of the Specification and the other claims, e.g., claims 22 (as originally filed), and claims 46-52. Applicants submit that the recitations in these claims of "fully-coupled" is supported in the Specification as originally filed in claims 18 and 22 and the Specification at [0019] has been amended without adding new matter to incorporate the language from claims 18 and 22 as originally filed.

The Examiner has also noted that the terms "first mathematical model", "second mathematical model", "first controller", "well-predicted" and "second controller" in claims 29, 36, 48, 51, 54, and 57 do not appear in the specification. Applicant submits that the above referenced portions of the Specification, e.g., at p. 8, lines 9-16, and p. 10, lines 4-6 and p. 12, lines 13-14, and p. 14, line 28 - p. 15, line 9, relating to an exemplary embodiment adequately support these recitations in claims 29 (as originally filed), and claims 36, 48, 51, 54 and 57, i.e., by way of example the "first controller" is the controller containing the original "internal model" or "the model" that gets "updated" (p. 12, line 14) (p. 15, line 5) (p. 8, lines 15-16) to form a second model that is used in the controller creating a second controller. (p. 8, lines 19-20) (p. 12, lines 14-15) (p. 15, lines 5-9).

Nevertheless, the Specification has been amended to more clearly support the recitations of "first controller", "first mathematical model", "second controller" and "second mathematical model" without adding new matter since the recitations appear in claim 29 as originally filed.

The Specification has also be amended to support the recitation of "well predicted" without adding new matter as the recitation was contained in claim 29 as originally filed.

The Examiner has pointed out that the term "behavioral range" appears in claims 30-31 and 37-38 only and not in the Specification. While applicant believes that the recitations of the claim are supported in the Specification as originally filed, the

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Specification has been amended to more specifically support the recitations of claim 30 and 31, without adding new matter since claims 30 and 31 were part of the disclosure of the above captioned application as filed. This also supports the similar recitations in claims 37-38.

The Examiner has pointed out that the recitation "start event" appears only in the claims, i.e., in claim 26. Applicant submits that the above referenced portions of the Specification referring to the definition of an "event" that initiates or starts the period of time where the control system is out of "normal mode," fully support the recitation in claim 26 of a "start event."

The Examiner has pointed out that the terms "temporary control signal", "pre-selected control signal", "disabling", "preexisting model" and "means for connecting" appear only in claim 39. While these terms may not expressly appear in the Specification or claims as originally filed, according to aspects of an embodiment of the invention claimed in the above captioned application they are all supported by the illustrative embodiment described in the disclosure as originally filed, and specifically the portions discussed above. Thus, in the exemplary embodiment the "temporary control signal" is one received from the signal generator 15 when the switch 10 selects the output of the signal generator while the control system is "temporarily" not in the "normal mode" and the "temporary control signal generator" injects "control signals" that are "preselected" to induce the responses from the apparatus to compare with the expected responses according to the original model, the "preexisting model," to get error values to update the original "preexisting model." The means for "disabling" the "controller means" is, e.g., the switch 10 that removes the output of the controller 21 from the control system. The "means for connecting the new controller" after the controller 21 has been updated is, e.g., also the switch 10.

These same comments apply as well to the similar recitations contained in claims 42, 52, and 58.

Claims 39-41, 42-44, 52 and 58 have been rejected under 35 U.S.C. §112, first paragraph for failing to meet the "written description" requirement. Applicant submits that the portions of the disclosure of the Specification and claims as originally filed as discussed above "reasonably convey to one skilled in the art that the inventor(s), at the

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time the application was filed, had possession of the claimed invention." As noted the terms in the claims, though maybe not precisely the terms used in the disclosure, find corresponding disclosed terminology in the disclosure that supports the claim recitations at issue. It is not necessary for the exact same language as used in the claims to appear in the Specification so long as the new terminology does not involve a departure from, addition to or deletion from the disclosure as originally filed. M.P.E.P. §2163.02. As noted above, the meaning of the terminology and its correspondence to the invention as disclosed is eminently clear.

For the above stated reasons the Examiner is respectfully requested to withdraw the rejection of claims 39-41, 42-44, 52 and 58.

Claims 26-28 have been rejected under 35 U.S.C. §102(e) as being anticipated by United States Patent No. 6,577,908 issued to Wojsznis ("Wojsznis"). Claim 26 has been amended to recite the gathering of data during the abnormal period of operation as discussed above. Since Wojsznis does not teach the gathering of data during an abnormal period of operation as defined in the Specification and discussed above the amendment removes Wojsznis as a reference under 35 U.S.C. §102(e) and the Examiner's rejection of claim 26 under 35 U.S.C. §102(e) is rendered improper. For this reason the Examiner is respectfully requested to withdraw the rejections of claim 26 and allow claim 26. For the same reasons, claims 27 and 28 should be allowable and the Examiner is respectfully requested to withdraw the rejections of claims 27 and 28 and allow claims 27 and 28. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988)

Claim 35 has been rejected as unpatentable under 35 U.S.C. §103(a) in light of Wojsznis and United States Patent No. 6,128,541 issued to Junk ("Junk"). Claim 35 has been amended to recite a feature not found in either Wojsznis or Junk or the combination of the two and, therefore, a *prima facie* case of obviousness does not exist as to claim 35 in view of the combination of Wojsznis and Junk. M.P.E.P. §2143.03. See *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974); *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970) (must consider all of the claim language).

For the above stated reasons, the Examiner is respectfully requested to agree that the claims 1, 22, 25, 29, 33-34, 36 and 42 are not "confusingly written" in light of the disclosure of exemplary embodiments in the Specification and to withdraw the rejections

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of claims 39-44, 52 and 58 under 35 U.S.C. §112, first paragraph and the rejection of claims 26-28 under 35 U.S.C. §102(e) and claim 35 under 35 U.S.C. §103(a) and allow claims 1-64 to issue in this case.

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Conclusion

Applicant believes that claims 1-64 now stand in condition for allowance and respectfully requests the Examiner to allow these claims.

Respectfully submitted,


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